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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10014199

Filing Date: 13 November 2001

Appellant(s): SRINIVAS GUTTA et al.

Thomas Spinelli, Esq., For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 25 November 2005 appealing from the Office action mailed 26 April 2005.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

The following is a listing of the evidence (e.g., patents, publications, Official Notice, and admitted prior art) relied upon in the rejection of claims under appeal.

Fig. 1 of the instant specification and its description at pp. 3-7, as admitted prior art.

Pao et al., US006134537A, 17 October 2000.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims. This is a verbatim copy of the final rejection mailed on 26 April 2005.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed with an amendment on 18 January 2004 have been fully considered but they are not persuasive. The arguments are addressed at para. 7-9 below.

Information Disclosure Statement

2. The listing of references in the specification (i.e., at pp. 5-6) is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-12[1] are rejected under 35 U.S.C. 103(a) as being obvious over the admitted prior art in view of Pao et al. (US006134537A).

5. Admitted as prior art is a method for classifying inputs to a neural network, and a related classifier, system and article of manufacture, the method comprising (spec. pp. 3-7 with

[1] As appellant notes, this summary is a typo: the rejected claims are in fact 1 and 3-12.

respect to Fig. 1): performing RBF analysis on a plurality of inputs to the neural network to produce a plurality of outputs; coupling each of the plurality of RBF outputs to a plurality of output nodes; multiplying each coupled RBF output by a weight selected for the coupled RBF output; calculating a node output for each output node; selecting a maximum output from the plurality of node outputs; and associating an output class with the maximum output.

6. The admitted prior art does not teach PCA. Pao et al. teaches PCA (col. 3 line 62). Because Pao et al. teaches methods to improve computational efficiency (col. 6 lines 24-26) that are compatible with an RBF architecture (col. 9 lines 50-52), it would have been obvious to one of ordinary skill in the art, at the time of the invention, to add the teachings of Pao et al. to the admitted prior art.

7. Applicant argues (p. 7, second para. from the bottom) that the specification begins discussing deficiencies of the prior art classifier at spec. p. 6, line 31. That is not correct: The spec. begins discussing deficiencies of the prior art classifier at p. 1, lines 33-34, in the section labeled "Background of the invention". Applicant also argues that the reference pp. 3-7 of the specification are not identified as prior art, and therefore do not comprise prior art. The reference pp. 3-7 of the spec. are a clear discussion of Fig. 1, which is identified in the text as prior art (spec. p. 3 lines 21-22) and also labeled as "prior art". The labeling of a figure as "prior art" has been held to be an admission that what was pictured was prior art relative to applicant's improvement (*In re Nomiya*, 509 F.2d 566, 571, 184 USPQ 607, 611 (CCPA 1975)).

8. Applicant argues (p. 7-8) that PCA is discussed only in the Background section. That is correct, but a reference is available for all that it teaches. The reference teaches the use of PCA in a neural network in the context of improving computational efficiency, which would recommend the reference to one of ordinary skill in the art.

9. Applicant argues (p. 8, middle para.) that Pao et al. provides no details for implementing PCA, and does not disclose or suggest the specific features of the instant claims. But these details are admitted prior art (para. 5 and 7 above). The Pao et al. reference is needed only to suggest the addition of PCA to the admitted prior art (para. 6 above). Applicant also argues that the reference does not teach that PCA is compatible with an RBF architecture. That is strictly true, and para. 6 above has been written accordingly.

The reference does suggest that its method, in general, is compatible with an RBF architecture, and that its method is also compatible with PCA. In this way Pao et al. suggests that PCA is compatible with an RBF architecture.

(10) Response to Argument

It is helpful to first summarize the rejection: Every element of the claims is admitted prior art (para. 5 above), except principal components analysis (PCA). Pao et al. teaches PCA (para. 6 above). Because Pao et al. offers PCA as a method for improving computational efficiency, it would have been obvious to one of ordinary skill in the art, at the time of the invention, to add PCA to the admitted prior art. Although not stated in the rejection, Pao et al. make it clear that PCA is the preferred method of three when a linear transformation is adequate (col. 10 lines 45-67).[2]

Appellant disputes only the addition of PCA to the admitted prior art. Appellant argues (p. 7 of 16, 1st full para.) that PCA has a failing for pattern recognition, according to Pao et al. (col. 2, lines 21-23). That is a correct quotation, but irrelevant, because the claims are not limited to pattern recognition. The claims are method and system for *classifying inputs*. Classification, which is sometimes called clustering[3], is a much broader objective than pattern recognition. The criticism at col. 2, lines 21-23 does not apply to all classification/clustering problems. Indeed, in the previous sentence, Pao et al. comments,

"That utilization of the Karhunen-Loeve transform for PCA purposes has been found to be valuable in dealing with many non-trivial problems." (Pao et al., col. 2, lines 18-21)

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[2] As noted in the spec. (p. 8 lines 10-12), PCA is sometimes called the Karhunen-Loeve or K-L transform. Pao et al. does so at col. 10 line 48.

[3] For example, by Pao et al., col. 11 line 3. This distinction between "pattern recognition" on one hand, and "classification" or "clustering" on the other hand, is based on the examiner's experience. In the examiner's experience, "classification" is the broader term, and it subsumes both "pattern recognition", which means clarifying visual images, and "clustering". Appellant has made of record an article by Turk et al. that describes pattern recognition. To the examiner, Fig. 6 in Pao et al. illustrates a clustering problem. Pao et al. uses both terms, and specifically describes Fig. 6 as an example of *clustering or classification procedures* (col. 11 lines 1-16). The examiner maintains that one of ordinary skill in the art would recognize a distinction between *pattern recognition* and *classification/clustering*. Appellant discloses both terms, and, at least at one place (spec. p. 4 lines 6 and 7), discloses "pattern recognition and classification", which suggests a distinction. Appellant does not disclose a "clear definition" (MPEP § 2111.01) for these terms.

The non-trivial problems to which Pao et al. is referring include classification/clustering problems other than pattern recognition. Since the instant claims are not limited to pattern recognition, the pertinent comment by Pao et al. is that PCA "has been found to be valuable", not that "it has a failing".

The instant specification (p. 8, lines 9 and 10) notes that

"PCA is a well known technique and is widely used in signal processing, statistics, and neural computing." (Spec. p. 8, lines 9-10)

PCA is "well known" and "widely used" because its failings are limited, not broad as implied by appellant at the top of p. 7 of 16.

Appellant argues (p. 7 of 16, 2nd and 3rd para.), again quoting Pao et al. (col. 4 lines 10-11 and col. 10 lines 48-52), that PCA is inherently linear. Furthermore, because Pao et al. prefer a nonlinear method, appellant argues that Pao et al. teaches away from PCA.

Appellant's logic is flawed. Starting with the last point first, Pao et al. teaches alternatives. A teaching of alternatives is not a teaching away.

Pao et al. compares the advantages and disadvantages of three dimension-reduction alternatives (col. 3 lines 51-66 and col. 10 lines 45-67). Pao et al. prefers the "NLVC" method (col. 11 lines 1-16), because it enables nonlinear distinctions (illustrated nicely by the three-part, nonlinear dotted line result in Fig. 6). But this nonlinear capability comes with a cost in complexity, as Pao et al. make clear in the comparison (col. 10 lines 45-67). If a problem can accept the simpler, linear constraint, then one of ordinary skill in the art would read Pao et al. to recommend PCA. The appellant's argument acknowledges that the instant invention can accept linear constraints:

"Since the Appellants' invention involves reducing the dimensions of input data using a system and method that employs linear outputs derived from PCA, ..." (p. 7 of 16, beginning of 3rd full para., emphasis added)

Appellant argues (p. 8 of 16) that the references do not teach or suggest performing PCA on a plurality of inputs, etc. This argument does not comply with the requirements of 37 CFR 1.111(b). Applicant has not specifically and distinctly pointed out the supposed errors of the rejection. The applicant's argument is a general allegation that

the claims define a patentable invention without specifically pointing out how the language of the claims patentable distinguishes them from the references.

Appellant argues in summary (p. 10 of 16) that the rejection has not made the requisite showing of motivation to combine the references. In summary, the showing is as follows.

Appellant has noted that PCA is well known and is widely used. While PCA is limited to linear constraints, appellant has stated that linear constraints are acceptable in the instant invention. (That is, the claims are not limited to nonlinear constraints.) When linear constraints are acceptable, Pao et al., especially through its comparison of pros and cons (col. 10 lines 45-67), makes it clear that PCA, because of its simplicity, is the obvious first choice for dimension reduction. For these reasons, it would have been obvious to one of ordinary skill in the art, at the time of the invention, to add the PCA teachings of Pao et al. to the admitted prior art.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Donald L. Champagne
Primary Examiner
Art Unit 3622

DONALD L. CHAMPAGNE
PRIMARY EXAMINER

7 June 2006

Conferees:

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